



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/358,940	07/22/1999	WHONCHEE LEE	3028.1US-96	2152

7590 02/14/2005

JOSEPH A WALKOWSKI  
TRASK BRITT & ROSSA PC  
P O BOX 2550  
SALT LAKE CITY, UT 84110

EXAMINER

VINH, LAN

ART UNIT	PAPER NUMBER
----------	--------------

1765

DATE MAILED: 02/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

49

<b>Office Action Summary</b>	<b>Application No.</b> 09/358,940	<b>Applicant(s)</b> LEE ET AL.	
	<b>Examiner</b> Lan Vinh	<b>Art Unit</b> 1765	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) ☒ Responsive to communication(s) filed on 22 November 2004.

2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) ☒ Claim(s) 1-4,6-9 and 11-15 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.

6) ☒ Claim(s) 1-4 and 6-9,11-15 is/are rejected.

7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.

8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All   b) ☐ Some \* c) ☐ None of:

- 1. ☐ Certified copies of the priority documents have been received.
- 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_

4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 9, 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Fornwalt et al (Re. 33,800)

Fornwalt discloses a method for electroplating using a wet etching solution containing: acetic acid/claimed organic acid and hydrofluoric acid/claimed fluoride containing solution (col 2, lines 30-34) which reads on an etchant solution consisting essentially of an organic acid and a fluorine-containing solution because "A consisting essentially of" claim occupies a middle ground between closed claims that are written in a consisting of format and fully open claims that are drafted in a comprising format." PPG Industries v. Guardian Industries, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). See also Atlas Powder v. E.I. duPont de Nemours & Co., 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); In re Janakirama-Rao, 317 F.2d 951, 137 USPQ 893 (CCPA 1963); Water Technologies Corp. vs. Calco, Ltd., 850 F.2d 660, 7 USPQ2d 1097 (Fed. Cir. 1988). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." See, e.g., PPG, 156 F.3d at 1355, 48

Art Unit: 1765

USPQ2d at 1355. It is noted that no patentable weight is given to the phrase “which selectively etches BPSG over TEOS” and “wherein said etchant solution exhibits a selectivity ratio of BPSG over TEOS between about 27:1 and 55:1” because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).

The limitation of claim 11 has been discussed above.

3. Claims 9, 11,15 are rejected under 35 U.S.C. 102(b) as being anticipated by De Brebisson (US 4,443,933)

De Brebisson discloses a method of manufacturing a semiconductor device comprises the step of etching using a solution containing ammonium fluoride and glacial acetic acid (col 5, lines 44-47). It is noted that no patentable weight is given to the phrase “which selectively etches BPSG over TEOS” and “wherein said etchant solution exhibits a selectivity ratio of BPSG over TEOS between about 27:1 and 55:1” because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).

The limitations of claims 11,15 have been discussed above.

4. Claims 9,11-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Kern et al (US 4,395,304)

Kern discloses a selective chemical for phosphosilicate glass containing: 80 % weight acetic acid/claimed organic acid and 49% hydrofluoric acid/claimed fluoride

Art Unit: 1765

containing solution and small fraction of water (col 2, lines 35-45) which reads on an etchant solution consisting essentially of an organic acid and a fluorine-containing solution because "A consisting essentially of" claim occupies a middle ground between closed claims that are written in a consisting of format and fully open claims that are drafted in a comprising format." PPG Industries v. Guardian Industries, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). See also Atlas Powder v. E.I. duPont de Nemours & Co., 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); *In re Janakirama-Rao*, 317 F.2d 951, 137 USPQ 893 (CCPA 1963); *Water Technologies Corp. vs. Calco, Ltd.*, 850 F.2d 660, 7 USPQ2d 1097 (Fed. Cir. 1988). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." See, e.g., PPG, 156 F.3d at 1355, 48 USPQ2d at 1355. It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" and "wherein said etchant solution exhibits a selectivity ratio of BPSG over TEOS between about 27:1 and 55:1" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).

The limitations of claims 11-12 have been discussed above.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1765

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kern et al (4,395,304) in view of Morimoto (US 4,721,548)

Kern etching solution has been described above. Unlike the instant claimed inventions as per claims 13-14, Kern fails to disclose the specific volume ratios of the acetic acid with the HF.

Morimoto discloses a semiconductor planarization process comprises the step of varying the volume ratio of acetic acid with HF (col 3, lines 15-17)

Thus, one skilled in the art would have found it obvious to vary the volume ratio of the acetic acid in Kern etching solution in view of Morimoto teaching because Morimoto discloses that the acetic acid is used to dilute the solution and to prevent etching of the wafer back (col 3, lines 18-20)

7. Claims 1-3, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fornwalt et al (Re.33,800) in view of Morimoto (US 4,721,548)

Fornwalt discloses a method for electroplating using a wet etching solution containing: acetic acid/claimed organic acid and hydrofluoric acid/claimed fluoride containing solution (col 2, lines 30-34) which reads on an etchant solution consisting essentially of an organic acid and a fluorine-containing solution because "A consisting essentially of' claim occupies a middle ground between closed claims that are written in a consisting of' format and fully open claims that are drafted in a comprising' format."

Art Unit: 1765

PPG Industries v. Guardian Industries, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). See also Atlas Powder v. E.I. duPont de Nemours & Co., 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); *In re Janakirama-Rao*, 317 F.2d 951, 137 USPQ 893 (CCPA 1963); *Water Technologies Corp. vs. Calco, Ltd.*, 850 F.2d 660, 7 USPQ2d 1097 (Fed. Cir. 1988). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." See, e.g., PPG, 156 F.3d at 1355, 48 USPQ2d at 1355. It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957). Forwalt discloses that the etching solution has a volume ratio of acetic acid with HF (col 2, lines 30-34)

Unlike the instant claimed inventions as per claims 1, 6, Forwalt fails to disclose the specific volume ratios of the acetic acid with the HF.

Morimoto discloses a semiconductor planarization process comprises the step of varying the volume ratio of acetic acid with HF ( 25:1 ) (col 3, lines 15-17)

Thus, one skilled in the art would have found it obvious to vary the volume ratio of the acetic acid in Forwalt etching solution in view of Morimoto teaching because Morimoto discloses that the acetic acid is used to dilute the solution and to prevent etching of the wafer back (col 3, lines 18-20)

The limitations of claims 2-3 have been discussed above.

Art Unit: 1765

Regarding claim 8, it is noted that no patentable weight is given to the phrase “wherein said etchant solution exhibits a selectivity ratio of BPSG over TEOS between about 27:1 and 55:1” because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).

8. Claims 1-4, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kern et al (US 4,395,304) in view of Morimoto (US 4,721,548)

Kern discloses a selective chemical for phosphosilicate glass containing: 80 % weight acetic acid/claimed organic acid and 49% hydrofluoric acid/claimed fluoride containing solution and small fraction of water (col 2, lines 35-45) which reads on an etchant solution consisting essentially of an organic acid and a fluorine-containing solution because “A consisting essentially of” claim occupies a middle ground between closed claims that are written in a consisting of’ format and fully open claims that are drafted in a comprising’ format.” PPG Industries v. Guardian Industries, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). See also Atlas Powder v. E.I. duPont de Nemours & Co., 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); *In re Janakirama-Rao*, 317 F.2d 951, 137 USPQ 893 (CCPA 1963); *Water Technologies Corp. vs. Calco, Ltd.*, 850 F.2d 660, 7 USPQ2d 1097 (Fed. Cir. 1988). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, “consisting essentially of” will be construed as equivalent to “comprising.”



See, e.g., PPG, 156 F.3d at 1355, 48 USPQ2d at 1355. It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).

Unlike the instant claimed inventions as per claims 1, 6, Kern fails to disclose the specific volume ratios of the acetic acid with the HF.

Morimoto discloses a semiconductor planarization process comprises the step of varying the volume ratio of acetic acid with HF ( 25:1) (col 3, lines 15-17)

Thus, one skilled in the art would have found it obvious to vary the volume ratio of the acetic acid in Kern etching solution in view of Morimoto teaching because Morimoto discloses that the acetic acid is used to dilute the solution and to prevent etching of the wafer back (col 3, lines 18-20)

9. Claims 1-3, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Brebisson (US 4,443,933) in view of Morimoto (US 4,721,548)

De Brebisson etching solution has been described above in paragraph 4. Unlike the instant claimed invention as per claim 1, De Brebisson fails to disclose the specific volume ratios of the acetic acid with the HF.

Morimoto discloses a semiconductor planarization process comprises the step of varying the volume ratio of acetic acid with HF (col 3, lines 15-17)

Thus, one skilled in the art would have found it obvious to vary the volume ratio of the acetic acid in De Brebisson etching solution in view of Morimoto

teaching because Morimoto discloses that the acetic acid is used to dilute the solution and to prevent etching of the wafer back (col 3, lines 18-20)

### ***Response to Arguments***

10. Applicant's arguments filed 11/22/2004 have been fully considered but they are not persuasive.

Applicants argue that the references of Forwalt, Kern fail to describe an organic acid comprising acetic, formic acid or oxalic acid. This argument is unpersuasive for the following reasons. The argument does not commensurate with the scope of claim 9 since claim 9 specifically requires "an organic acid selected from the group consisting of acetic acid, formic acid and oxalic acid", which is a Markush-type claim/alternative limitations (MPEP 2173.05 (h)). Therefore, it is noted that only one element of the Markush group, recited in claim 9, is required in claim 9. Since Forwalt discloses a solution includes acetic acid (col 2, lines 30-34) and Kern discloses a solution includes carboxylic acid such as an acetic acid (col 2, lines 30-34) the examiner maintains that Forwalt and Kern discloses "an organic acid selected from the group consisting of acetic acid, formic acid and oxalic acid".

Applicants further argue that the element of "wherein the etchant solution exhibits a selectively ratio of BPSG to TEOS between about 27:1 and 55:1" must be given patentable weight because this claim element affects the composition of claim 9. This argument is unpersuasive because the examiner notes that "A "whereby" or "wherein" clauses that merely states the result of the limitation in the claim adds nothing to the

Art Unit: 1765

patentability or substance of the claim" (see *Texas Instrument Inc. v. International Trade Commission*, 26 USPQ2d 1010 (Fed. Cir. 1993). The clause "wherein the etchant solution exhibits a selectively ratio of BPSG to TEOS between about 27:1 and 55:1", as recited in claim 9, does not clarify what is required by the claim and limit the claim. Thus, the element of "wherein the etchant solution exhibits a selectively ratio of BPSG to TEOS between about 27:1 and 55:1" should not be given patentable weight

In response to applicant's argument that there is no suggestion to combine the references of Forwalt/Kern/Brebisson with Morimoto because the Morimoto solution includes additional component, Morimoto does not teach or suggest that the same ratio would be successful if the nitric acid were removed, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, although the examiner recognizes that Morimoto solution includes additional element, the examiner only relies on Morimoto for the teaching that the specific concentration of acetic acid is used to dilute a solution and to prevent etching of the wafer back. Since the motivation to combine the references come from the Morimoto, one skilled in the art at the time the invention was made would have found it obvious to follow the teaching of Forwalt/Kern/Brebisson and Moromimoto to produce the claimed invention.

Art Unit: 1765

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

### ***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1765

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to be 'LV' followed by a stylized flourish.

LV  
February 7, 2005